

What is claimed is:

*X3*

1. A portable packaging device for individually packaging an article within a flexible tubular sheet, the device having an inlet end and an outlet end, and comprising:
  - a body formed by an inner core having an inlet opening and an outlet opening, and a passageway there between for passing there through an article to be packaged,
  - a casing comprising a surrounding casing wall, and a base wall that joins an end of the surrounding casing wall to the body, the body and the casing defining a storage space and a dispensing opening at the inlet end, wherein the device can retain a length of the flexible tubular sheet within the storage space, wherein the tubular sheet can be dispensed through the dispensing opening and into the inlet opening of the inner core, the article to be packaged can be inserted through the inlet opening and inside the tubular sheet, and the tubular sheet can be gathered and closed at each end to form a closed packaged article, and
  - a means for separating the closed packaged article from a trailing portion of the tubular sheet, to remove the closed individually packaged article through the outlet opening.
2. The portable packaging device according to Claim 1, wherein the separating means comprises a cutting means positioned adjacent the outlet opening of the inner core, for cutting through a trailing portion of the tubular film to form the closed individually packaged article.
- X3*  
3. The portable packaging device according to Claims 1, further comprising the length of flexible tubular sheet.
4. The portable packaging device according to Claim 3, wherein the separating means comprises a separable region within the tubular sheet, whereby the tubular sheet can be separated one portion from another portion along the separable region more easily than along a remaining portion of the tubular film.
- X3*  
5. The portable packaging device according to Claim 3, wherein the tubular sheet has an outer surface, the outer surface facing inward when the tubular sheet is passed

through the inner core, the outer surface comprising an adhesive material, whereby a leading portion and a trailing portion of the tubular sheet can be closed on each side of article with the adhesive material, thereby forming the closed individually package article.

6. The portable packaging device according to Claim 5 wherein the tubular film comprises a three-dimensional film having an outer surface that comprises a plurality of recessed pressure sensitive adhesive sites and a plurality of collapsible protrusions that serve as stand-offs to prevent premature sticking of the adhesive sites to a target surface until a force sufficient to collapse the protrusions has been applied to the opposed surface of the film.

7. The package device according to Claim 6, wherein the article to be packaged is a waste-filled disposable absorbent article.

8. The portable packaging device according to Claim 1, further comprising a cap covering at least a portion of the dispensing opening for retaining the length of non-resilient flexible tubular sheet.

9. The packaging device according to Claim 1, further comprising a handle to facilitate holding and carrying the device.

10. A portable packaging device for individually packaging an article within a flexible tubular sheet, the device having an inlet end and an outlet end, and comprising:

5        a body formed by an inner core having an inlet opening and an outlet opening, and a passageway there between for passing there through an article to be packaged,

10        a casing comprising a surrounding casing wall, and an base wall that joins an end of the surrounding casing wall to the body, the body and the casing defining a storage space and a dispensing opening at the inlet end, wherein the device can retain a length of the flexible tubular sheet within the storage space, wherein the tubular sheet can be dispensed through the dispensing opening and into the inlet opening of the inner core, the article to be packaged can be inserted through the inlet opening

and inside the tubular sheet, and the tubular sheet can be gathered and closed at each end to form a closed packaged article, and wherein the shape of the outlet opening and a portion of the passageway are oval or elliptical.

11. A portable packaging device for individually packaging an article within a flexible tubular sheet, the device having an inlet end and an outlet end, and comprising:

a body formed by an inner core having an inlet opening and an outlet opening, and a passageway there between for passing there through an article to be packaged,

5 a casing comprising a surrounding casing wall, and an base wall that joins an end of the surrounding casing wall to the body, the body and the casing defining a storage space and a dispensing opening at the inlet end, wherein the device can retain a length of the flexible tubular sheet within the storage space, wherein the tubular sheet can be dispensed through the dispensing opening and into the inlet opening of the inner core, the article to be packaged can be inserted through the inlet opening and inside the tubular sheet, and the tubular sheet can be gathered and closed at each end to form a closed packaged article, and wherein the passageway is curved, and is preferably an elbow.

12. A method for manually forming a closed individually packaged article from a tubular sheet, comprising the steps of:

a. providing a portable packaging device having an inlet end and an outlet end, comprising:

5 i) a body formed by an inner core having an inlet opening and an outlet opening, and a passageway there between for passing there through an article to be packaged, and  
ii) a casing comprising a surrounding casing wall, and an base wall that joins an end of the surrounding casing wall to the body, the body and the surrounding casing wall defining a storage space and a dispensing opening at the inlet end,

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b. providing a length of flexible tubular sheet retained within the storage space, the tubular sheet having a leading edge and a trailing portion that follows the leading edge,

15 c. dispensing the leading edge from the storage space through the dispensing opening and the inlet opening, and into the passageway of the inner core,

d. gathering and closing the leading edge, thereby forming with the trailing portion a receiving pouch within the passageway of the inner core,

e. inserting an article to be packaged by a user of the device into the receiving  
20 pouch,

f. gathering the trailing portion behind the article, thereby forming an individually packaged article,

g. closing the gathered trailing portion, and

h. separating the closed individually packaged article from a further trailing  
25 portion of the tubular sheet at the closed gathered trailing portion.

13. The method of Claim 12, wherein the step f of gathering the trailing portion of the tubular sheet comprises inserting the users hand through the outlet opening and into the passageway, and grasping by hand and twisting the individually packaged article.

14. The method of Claim 12, wherein the step h of separating the closed individually packaged article comprises cutting through the closed gathered trailing portion.

15. The method of Claim 12, wherein the step h of separating comprises pulling apart or tearing the tubular sheet, one portion from another, along a separable region within the tubular sheet.

16. The method of Claim 12, wherein the tubular sheet provided in step b has an outer surface facing inward when the tubular sheet is positioned inside the passageway, the outer surface comprising an adhesive material, whereby closing the leading edge of step d and the gathered trailing portion in step g comprises closing  
5 with the adhesive material.

17. The method of claim 16 wherein the tubular sheet comprises a three-dimensional film sheet, the inside surface comprising a plurality of recessed pressure sensitive adhesive sites and a plurality of collapsible protrusions which serve as stand-offs to prevent premature sticking of the adhesive sites to a target surface until a force  
5 sufficient to collapse the protrusions has been applied to the opposed surface of the film.

18. The method of Claim 17, wherein the closed individually packaged article can maintain a seal at an ambient temperature of 35°C with an internal differential pressure of +26 mm Hg.

19. An apparatus for forming a pleated layered pack of tubular sheet from a length of flexible tubular sheet material and having an inner surface, comprising:  
a) a central mandrel having a film receiving end and a base end, an external circumference determined by an internal diameter for each layered pack, and a  
5 plurality of slots positioned circumferentially around the central mandrel and extending axially from the base end and ending toward the film receiving end,  
b) a base positioned at the base end of the central mandrel,  
c) a means for feeding the tubular film onto the central mandrel in pleated layers, comprising  
10 i) an engaging means registered with each slot, having an extended position extending through the slot to contact the inner surface of the tubular film, and a retracted position within the central mandrel,  
ii) an extending means for moving the engaging means radially between the extended position and the retracted position,  
15 iii) a reciprocating means for moving the engaging means axially between a pickup position near the film receiving end of the slot, and a deposit position toward the base end, and  
iv) a drive means for driving the extending means and the reciprocating means in synchronized timing, wherein the engaging means proceeds through  
20 a cycle of:

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- a) the extended position at the pickup position, thereby engaging the inner surface of the tubular film,
- b) the extended position at the deposit position, thereby pulling the tubular film down to form a pleated layer,
- c) the retracted position at the deposit position, thereby disengaging from the inner surface of the pleated tubular film, and
- d) the retracted position at the pickup, thereby returning to the beginning of the cycle,  
thereby forming the pleated layered pack of tubular sheet.

20. The apparatus according to claim 19, further comprising an indexing means whereby the distance between the pickup position and the deposit position is maintained substantially constant.

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